

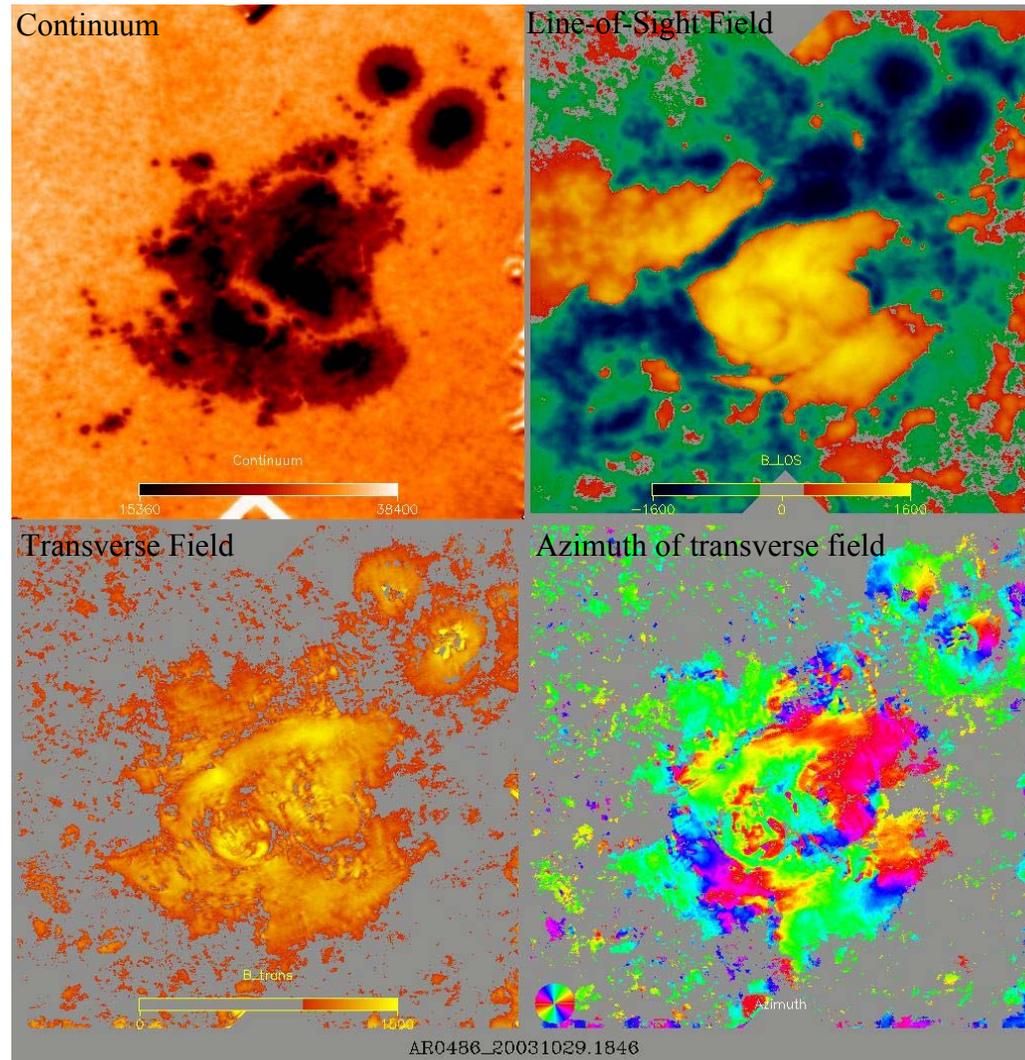
The Magnetic Free Energy in Active Region 10486



Chromospheric
vector magnetogram
from 2003 Oct 29
at 18:46 UT, before the
X10 flare which started
about 20:35 UT.

We apply the magnetic
virial theorem to derive
the energy stored in the
coronal magnetic field
above this active region.

How does the energy in
the magnetic field
correlate with activity?



October 29, 2003: Energetics



18:46 UT, Magnetic energy in ergs

Total Magnetic Energy	$(11.9 \pm 2.3) \times 10^{33}$
Potential Magnetic Energy	3.3×10^{33}
Free Magnetic Energy	$(8.6 \pm 2.3) \times 10^{33}$

- 2 hours before the X10 flare, AR10486 had a very large amount of free energy (almost 10^{34} ergs).
- This is intriguing, considering the extreme level of activity in this active region.
- We conclude that, despite the unusually large number of big flares, AR10486 contained plenty of free magnetic energy to power the extreme activity.